



# **CAN THE FCC ATTRACT A FULL HOUSE FOR THE 2016 BROADCAST INCENTIVE AUCTION?**

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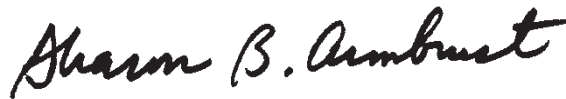
Our assignment was to prepare an analysis of the financial capacity and competitive appetite of the wireless carriers, in particular AT&T and Verizon, to fully participate in back-to-back AWS-3 and 600 MHz Incentive auctions, assuming a 2016 start date for the 600 MHz Incentive Auction. This report is for informational purposes only and is not intended for use in any business plan nor does it constitute financial, legal, regulatory, tax or accounting advice. It is offered solely as an independent study of current events in the U.S. wireless industry as they might relate to the planned Incentive Auction to be held by the FCC in 2016 for 600 MHz spectrum currently licensed to U.S. television broadcasters and should not be considered a recommendation, opinion, or advice of any kind with respect to the Incentive Auction opportunities.. Any estimates of value cited in this report are a result of our independent conclusions based on the assumptions, analyses and discussions contained in the following pages. Due to market fluctuations and circumstances beyond an appraiser's control, KMA does not warrant that a buyer will pay any of the referenced values discussed for auctioned spectrum. We make no representation or warranty with regard to this presentation or the Incentive Auction. Readers of this report are strongly urged to conduct their own independent investigation and due diligence regarding the Incentive Auction opportunities and make any decisions based on the advice of their own financial, legal, regulatory, tax, accounting and other advisors.

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Signed:

A handwritten signature in black ink, reading "Sharon B. Armbrust", written over a horizontal line.

Kagan Media Appraisals/Sharon B. Armbrust

A White Paper Report commissioned by the Expanding Opportunities for Broadcasters Coalition

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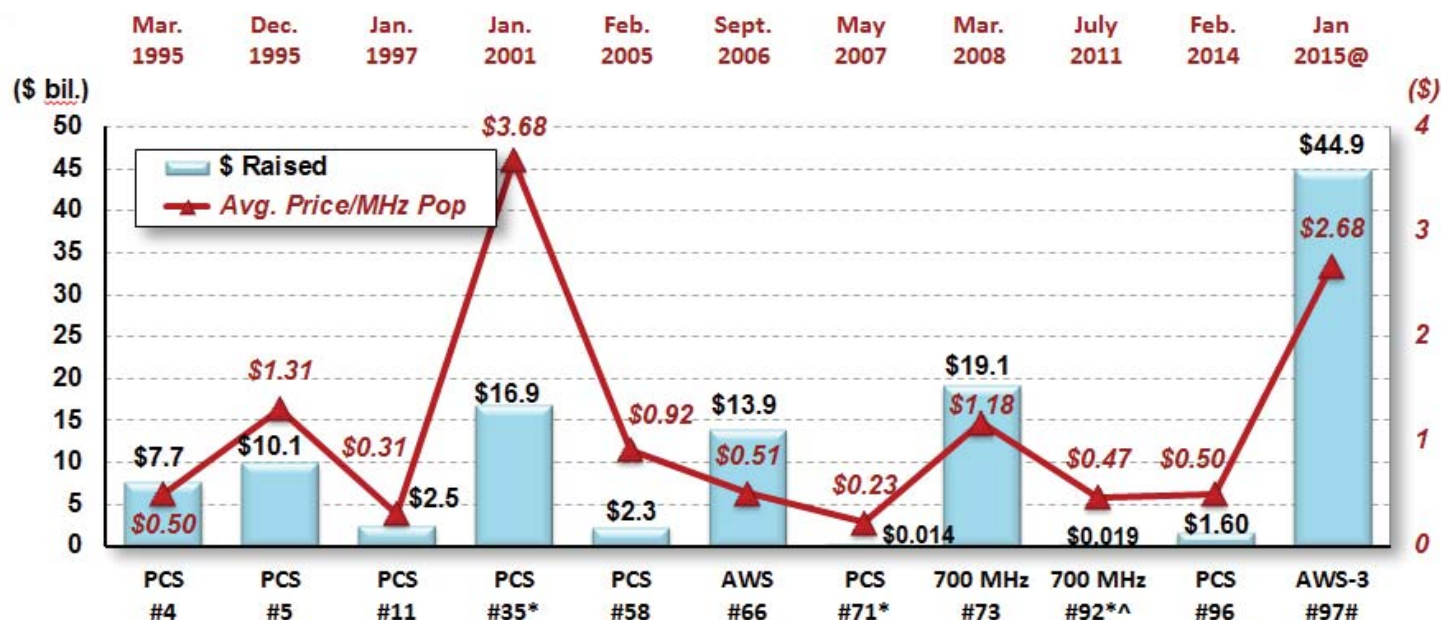
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## Introduction

At the CTIA's Super Mobility Week in September 2014, FCC Chairman Tom Wheeler lobbied wireless operators to help make the Incentive Auction a success by demonstrating to broadcasters their interest in more spectrum.

Rather than just make verbal commitments to the still evolving Incentive Auction, planned for early 2016, the wireless industry voted with its collective feet in the just-ended AWS-3 auction 97, bidding explosively for that mid-band spectrum for which total bids topped out at \$44.9 billion, or about \$2.68 per MHz pop on average for all the paired spectrum that was offered. Those results more than doubled the price/MHz pop paid for 700 MHz spectrum in the six-year-old Auction 73, itself a record-breaking event.

## Mobile Wireless Spectrum Auctions: 1995-2015



Data estimated. Per-MHz pop data based on population counts for year of or preceding auction. \* Re-auction. ^ Avg. price/MHz pop of \$0.47 U.S. only; \$0.67 including Puerto Rico licenses. @ AWS-3 high price was \$6.05/MHz pop gross, but won by DE, discounted to \$4.53/MHz pop; highest non-DE price in single market \$5.71/MHz pop. #The average gross price for paired spectrum; avg. price for uplink was \$0.51/MHz pop. ©2015 Kagan Media Appraisals, a service of SNL Financial LC, estimates. All rights reserved.

If actions speak louder than words, broadcasters should be convinced of the benefits of participating in the Incentive Auction with as much enthusiasm as the wireless carriers exhibited in the AWS-3 contest.

In fact, demand for the 600 MHz spectrum has never been in question. The major carriers were on record well before the blockbuster AWS-3 auction that they would be on board to bid heavily in the 600 MHz Incentive Auction. AT&T indicated as early as June 2014 its commitment to the Incentive Auction, saying it intended to bid "at least \$9 billion in connection with the [then planned] 2015 incentive auction, provided there is sufficient spectrum available in the auction to provide AT&T a viable path to at least a 2x10 MHz nationwide spectrum footprint."<sup>1</sup> And in July 2014, Sprint and T-Mobile US were making plans to jointly raise a \$10 billion fund for 600 MHz bidding before the FCC rejected joint bidding in the auction.<sup>2</sup>

Summarized below and discussed throughout this report are compelling reasons why all four of the existing national wireless operators – Verizon, AT&T, T-Mobile and Sprint - and very possibly other, non-declared contenders, are expected to be fully engaged and sufficiently capitalized bidders in the 2016 Broadcast Incentive Auction.

- **Mobile data traffic in the United States will grow 7-fold over the next five years.** To meet this demand will require the full range of tools available to the wireless mobile industry players – more spectrum, exploiting technology innovations, partnerships, network sharing, layered and integrated networks.

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<sup>1</sup> [http://licensing.fcc.gov/myibfs/download.do?attachment\\_key=1050160](http://licensing.fcc.gov/myibfs/download.do?attachment_key=1050160)  
<http://apps.fcc.gov/ecfs/comment/view?id=6017637381>

<sup>2</sup> [http://www.wsj.com/articles/sprint-t-mobile-could-raise-10-billion-for-spectrum-auction-1405445417?mod=WSJ\\_hp\\_LEFTWhatsNewsCollection](http://www.wsj.com/articles/sprint-t-mobile-could-raise-10-billion-for-spectrum-auction-1405445417?mod=WSJ_hp_LEFTWhatsNewsCollection)

- **There is capital available.** The capital markets are open to these companies. Verizon and AT&T are high profile investment grade borrowers with multiple options for raising cash and monetizing assets. T-Mobile and Sprint have investment grade parent companies with resources to support them at will. They both successfully accessed the public capital markets in 2014 and also have partnership and/or monetization options for raising cash.
- **T-Mobile and Sprint need low band spectrum to compete effectively over the long term.** Sprint has just 14 MHz of low band spectrum on average and T-Mobile has approximately 12 MHz of low band spectrum across about two-thirds of the U.S. population, some of which still has interference issues. AT&T and Verizon have between 45- 55 MHz in most markets.
- **Adding more spectrum is pivotal to Verizon and AT&T multi-pronged agendas.** Both companies are pursuing new cross-platform business strategies and want to preserve their competitive leads in mobile, yet have tight ratios of available spectrum for the large customer bases they serve. Additional spectrum will improve network quality, help maintain competitive advantages and enable new business initiatives.

The unintended consequence of the exuberant bidding in the AWS-3 auction is that it calls into question what resources the major wireless carriers will bring to the table in an Incentive Auction that follows so closely on the heels of such extravagant spending.

The receipts from Auction 97 are near what the wireless industry's capital expenditures in all of 2014. And the lion's share of that spend (63%) will be shouldered by the two dominant carriers: Verizon and AT&T. However, in the long term, spectrum auctions are a one-time, unrepeatable opportunity, occurring infrequently compared to network capital spending, which occurs every year and which totaled more than \$268 billion over the past 10 years according to CTIA survey data.

The three large auctions investors have used as valuation benchmarks during that time period were Auctions #66-AWS (2006), #73-700 MHz (2008) and #97-AWS (2014-'15), which combined raised nearly \$78 billion, or less than 30% of the 10-year spend on plant investment. Although the AWS-3 and 600 MHz auctions will be, according to current plans, not much closer together than were the 2006 and 2008 auctions, the rub is that the dollar levels for the AWS-3 and 600 MHz auctions are expected to be dramatically higher — perhaps 3.5x higher. Granted the business had grown well, but not by 3.5x between 2006 and 2015. But the profile and value of spectrum has taken on new dimensions. When the industry was less mature and unsaturated, spectrum was table stakes to play in the lucrative game of selling mobile voice services. As the technology curve has soared, the quantity and distribution of spectrum holdings have become an indispensable tool for deploying high-quality, high-speed platforms, and for achieving differentiation that can attract and retain consumers and create clear business advantages for companies in the enterprise space.

Alongside the more straightforward balance-sheet and credit-market concerns that could impact carrier participation and the ultimate results of the Incentive Auction, there are also the more layered strategic objectives and interplay that will weigh on auction participation. Industry players are now contending with an increasingly cross-pollinated world of media and communications, with the attendant competitive challenges and cross-medium opportunities. Also not to be underestimated are the parallel regulatory and political actions that influence many industry moves.

In the increasingly complex U.S. wireless industry, carriers are faced with daily decision trees driven by many conflicting options and "What If" courses of action.

So what are some of the highly visible items on the menu in 2015-'16? To name a few:

1. Net Neutrality and possible Title II Classification for wired and wireless distribution.



2. Financing the record-breaking \$45 billion AWS-3 Auction 97.
3. AT&T's \$65 billion buyout of DIRECTV and three-pronged Mexican wireless expansion.
4. Comcast's \$70 billion merger with Time Warner Cable and its effect on competition.
5. A mobile wireless revolution that is upending traditional business models in all industries.
6. A ferocious street fight for mobile customers that challenges the industry's economics.
7. Google's angle should it jump into the overheated wireless arena as an MVNO.
8. Municipal, cable and Internet company Wi-Fi network aspirations.
9. Over-the-Top programming competitions.
10. The direction of interest rates.

Some of these events or developments will be critical to the paths carriers take to the Broadcast Incentive Auction. Some will simply be added noise.

All are part of the environment in which wireless carriers compete and, as such, a backdrop to our analysis of the financial capacity and competitive appetite AT&T, Verizon, T-Mobile and Sprint have to fully participate in back-to-back AWS-3 and 600 MHz Incentive Auctions.

### **The FCC has a full plate.**

The FCC is currently juggling and coordinating multiple initiatives that will have a major impact the future course of U.S. media and communications industries.

- It has just closed (Jan. 29, 2015) the biggest spectrum auction the U.S. communications industry has ever seen, the AWS-3 Auction 97, raising a remarkable \$45 billion. Together with the previous H Block AWS #96 auction, that will provide enough money to build out the next-generation nationwide public-safety network and still generate at least \$30 billion for the U.S. Treasury. The unexpectedly large sum taken in from the AWS-3 auction gives the FCC much more wiggle room in designing the 600 MHz auction to achieve public policy goals and also generate new income for the Treasury. That speaks to the FCC keeping to the current early 2016 schedule for the Incentive Auction, in which a primary goal is to distribute more low-band spectrum to operators which are disadvantaged without it — and from the FCC's perspective, the sooner the better.

- It is tackling the contentious, complex and misunderstood issue of so-called Net Neutrality that will rule the media and communications landscape for the next several decades. A vote is scheduled for Feb. 26, and Chairman Tom Wheeler announced Feb. 4 that the FCC will use its Title II authority to implement and enforce "the strongest open Internet protections ever proposed by the FCC." But simultaneously, the Republican-dominated Congress is trying to push through legislation that proposes an alternative Net Neutrality solution. All sides assume Net Neutrality will precipitate years of legal wrangling. Therefore, most of the commentary around it classifies as politically driven.
- Until now, mobile voice has been regulated under a so-called "light touch" Title II, but neither wired nor wireless data has been regulated as a telecommunications service. The FCC plans to bring mobile data under the new Title regulation as well, which will certainly impact the industry's cost of doing business. Today, 55% of online traffic happens on smartphones and tablets, according to the FCC, and that share continues to grow rapidly. Long before Wheeler confirmed the FCC's intent to impose Title II, Verizon and AT&T had both indicated they will sue the FCC if the regulation is adopted.
- To top off this heady agenda, the FCC is planning a "changing of the guard" event in the valuable 600 MHz spectrum band. Via an unprecedented double auction (reverse and forward), the 600 MHz Broadcast Incentive Auction, the FCC will choreograph and mediate the buyout and/or relocation of hundreds of TV-station licenses and the simultaneous sale of the recaptured spectrum to avid broadband wireless bidders.

The FCC understands that the initial driver for the Incentive Auction is supply. Therefore, a major preparatory goal is to get the TV broadcasters completely comfortable with the process and enthusiastic about the opportunities a Reverse Auction offers them. To that end, it is beginning an educational 50-city road show starting Feb. 9 that will travel around the country advocating for the auction. The FCC actually already made its first move toward initiating the broadcasters into the possibilities in the Incentive Auction with its sponsored publication of the

Greenhill & Co. Report in October 2014 (revised Feb. 5, 2015).<sup>3</sup> This first analysis calculated theoretical high-end station values for every DMA<sup>®</sup> in the country and whetted the interest of many broadcasters. In the February 2015 update report, theoretical high/starting bid prices (which is not the same as the original estimates of highest station values) are shown instead. Although in some markets like San Diego, Palm Springs and Wilkes-Barre/Scranton, the starting prices are lower than the value for those markets were in October, on average they are 4x higher than the estimated maximum DMA<sup>®</sup> price points the analysis articulated in October 2014. That is the calling card with which the FCC's road show intends to build its case for broadcaster participation. The FCC is obviously using the AWS-3 results as another carrot for broadcasters. But even while highlighting the best-case potential of the auction via the Greenhill opening-bid suggestions, the FCC also indicated that the Greenhill exercise assumed an ultimate conclusion to the Incentive Auction at about \$45 billion, or just under \$1.50 per MHz pop on average. That would place the Incentive Auction in a virtual tie with the actual AWS-3 auction dollars raised, which is unlikely.

The FCC cannot know how much the Incentive Auction will raise. It cannot even identify the scope of the band plan until an average price of \$1.25/MHz pop is reached across the top 40 PEA markets in the auction and a forward auction spectrum benchmark of 70 MHz, corresponding to a broadcast spectrum clearing target of 84 MHz. That benchmark level will then trigger the set-aside of up to 30 MHz reserved for bidders who have less than 45 MHz of sub-1 GHz spectrum per market in their current portfolios. Only after the reserve has been met will the band plan be finalized.

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<sup>3</sup> <http://www.commlawblog.com/tags/greenhill-report/>

Our analysis assumes the receipts from all bidders in the 600 MHz auction could well be in the \$60 billion-\$80 billion range, depending on how many megahertz are being sold once the final stage of the auction is reached. That range implies a doubling of the price paid for the 700 MHz spectrum sold in Auction 73 in 2008.

The FCC has set a relatively low bar of \$1.25/MHz pop as a reserve price in the upcoming auction, but we anticipate there will be multiple bidders that will value 600 MHz spectrum at \$2.50/MHz pop or higher on average, even with restricted competition in some of the blocks.

Given the robustness of the predecessor AWS-3 auction and what it achieved for both public safety and the Treasury, the FCC will likely be able to call the Incentive Auction a success if, after reaching the reserve requirements, it:

- a) Generates enough broadcast supply to match wireless carrier demand;
- b) Generates enough carrier demand to reach and comfortably exceed the reserve level;
- c) Generates sufficient receipts to cover FCC and broadcaster repacking costs, to further support the public-safety network requirements and to bolster the U.S. Treasury; and
- d) Establishes a precedent for incentive auctions as a viable vehicle for future redistributions of government and commercial radio spectrum.

## **The State of the Wireless Union**

It is noteworthy that the new spectrum coming into the marketplace in 2015 and again in 2016 will be addressing a vastly different marketplace than existed when the last low-band spectrum was sold at auction more than six years ago.

Through 2012, Verizon and AT&T continued to expand their lead over other competitors in terms of market share, even as the penetration of wireless across the nation left fewer and fewer people who had never had mobile wireless service. Aiding the strong growth in mobile subscriptions and gradually increasing usage of data on 3G networks was Apple's iconic iPhone, announced in January 2007 and launched in June of that year. In 2007, wireless subscription penetration was 80%; today it is over 115%.

AT&T scored an iPhone exclusivity agreement that was supposedly a five-year deal, but was renegotiated over time — but not before the overwhelming popularity of the iPhone flooded AT&T with new subscribers and overwhelmed AT&T's network in many major markets. Nonetheless, AT&T rode its exclusivity wave until early 2011, when Verizon and Apple struck a deal for a CDMA iPhone that would work on Verizon's network. Later in 2011, Sprint also got access to the iPhone, then in its third generation. Because T-Mobile did not get access to the iPhone and was bleeding subscribers due to that hole in its offerings, Deutsche Telekom decided to sell its U.S. subsidiary to AT&T. The giant \$39 billion cash-and-stock merger, announced in March 2011, twisted in the regulatory wind for a year before being rejected by the Department of Justice. The demise of that deal cost AT&T \$4 billion in a cash-and-spectrum-license breakup fee.

At the same time, the next-generation 4G LTE technology was getting a foothold, with Verizon leading the charge. To overcome the limitations of its CDMA 3G+ technology, which had no plausible transition path to 4G technologies, Verizon put its LTE network overhaul into

overdrive. Having gained access to the iPhone and taken the lead in the faster, more efficient IP-based LTE technology, Verizon started regaining its edge over AT&T.

T-Mobile and Sprint were straining to keep up, struggling financially and looking toward each other to rebalance the playing field. Giant Japanese conglomerate SoftBank stepped in instead with an offer for Sprint in October 2012. That same month, Deutsche Telekom decided on a merger of T-Mobile US with Metro PCS. That reverse merger closed in May 2013, while SoftBank's purchase of Sprint closed in July 2013. Sprint and T-Mobile had not given up on a deal with each other, but regulators saw things differently.

More than a year after the SoftBank and Metro PCS deals closed, Sprint officially dropped its pursuit of T-Mobile US in August 2014, following the FCC's and DOJ's implicit rejection of a three-carrier construct for the U.S. mobile industry. The merger agreement was never announced, even though both had been contemplating it for the better part of a year. The two were set adrift to figure out their strategic options and stand-alone business models.

Since that time, Sprint has struggled to gain its footing, weighed down by a complex overhaul of its network across its patchwork of different frequencies, and still burdened by the residual financial and operating pain it suffered from a poorly executed merger with Nextel in 2005.

Meanwhile, T-Mobile hatched and executed extremely well a spoiler business model and marketing campaign focused on tearing down the longtime service-plan structures and restrictive policies of the industry. It has been able to add almost 12 million new subscribers over the past seven quarters, while Sprint continued to lose customers. It is about to overtake Sprint in total customer count and has been gaining share consistently against Verizon, AT&T and Sprint. As the customer addition statistics for the second half of 2014 show, T-Mobile is in a horse race with Verizon and AT&T — and Sprint has effectively been out of the game.

#### 4Q2014 Subscription Net Additions

Net Adds	<u>Verizon</u>		<u>T-Mobile</u>		<u>AT&amp;T</u>		<u>Sprint</u>	
in millions	<b>3Q14</b>	<b>4Q14</b>	<b>3Q14</b>	<b>4Q14</b>	<b>3Q14</b>	<b>4Q14</b>	<b>3Q14</b>	<b>4Q14</b>
<b>Postpaid Total</b>	1.6	2.0	1.4	1.3	0.8	0.9	(0.4)	(0.2)
<b>-phones</b>	0.5	0.6	1.2	0.9	0.4	(0.1)	(0.8)	(0.6)
<b>-tablets</b>	1.1	1.4	0.2	0.4	0.4	1.0	0.4	0.5
<b>Retail Prepaid Total</b>	0.1	0.1	0.4	0.3	(0.1)	(0.2)	(0.0)	0.4
<b>Wholesale/Affiliates</b>	0.4	0.2	0.6	0.1	0.1	(0.1)	0.4	-
<b>Connected Devices</b>	0.6	0.5	0.2	0.2	1.3	1.3	0.5	0.7
<b>Total Net Adds All Types</b>	2.6	2.8	2.6	1.8	2.0	1.9	0.48	0.9

#### Year-end 2014 Subscription Base

	<u>Verizon</u>		<u>T-Mobile</u>		<u>AT&amp;T</u>		<u>Sprint</u>	
in millions	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>	<b>2013</b>	<b>2014</b>
<b>Postpaid Total</b>	96.8	102.1	22.3	27.2	72.6	75.9	29.9	28.7
<b>-phones</b>	93.1	94.1	21.6	25.7	68.0	69.3	28.5	25.5
<b>-tablets</b>	3.7	8.0	0.7	1.5	4.7	6.6	1.5	3.2
<b>Retail Prepaid Total</b>	6.0	6.1	15.1	16.3	7.4	11.0	16.2	15.5
<b>Wholesale/Affiliates</b>	9.7	10.5	5.7	7.1	14.0	13.9	4.7	5.3
<b>M2M/Connected Devices</b>	13.1	15.0	3.6	4.4	16.3	19.8	4.5	3.4
<b>Total Connections</b>	125.6	133.7	46.7	55.0	110.4	120.6	55.4	55.9

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In spite of T-Mobile's success, parent Deutsche Telekom continues to advertise its interest in finding a buyer or partner for T-Mobile US, and its CEO has indicated that T-Mobile's current strategy is not sustainable over the long term. Still, the new competition in wireless has introduced structural changes and a level of price competition that is pressuring service revenues and profit margins for all carriers in the market.

The table below shows the different inflection points in the last five years of U.S. wireless subscription growth and the change in momentum that occurred as T-Mobile found its go-to marketing strategy and Sprint continued to suffer customer losses from its still-deficient network and poor reputation. T-Mobile's disruptive model has left none of the other carriers undisturbed.

## National Carrier Year-End Market Shares and Subscriptions by Category

	2011	2012	2013	2014
<b>4 Carrier Total Subs:</b>	301,692,123	314,657,973	337,983,907	365,212,000
<b><u>Market Shares</u></b>				
AT&T*	34.2%	34.0%	32.7%	33.0%
Verizon	36.5%	37.7%	37.2%	36.6%
Sprint	18.2%	17.7%	16.4%	15.3%
T-Mobile*	11.0%	10.6%	13.8%	15.1%

\*T-Mobile large jump in market share in 2013 includes Metro PCS acquisition; AT&T's small gain in 2014 includes Leap acquisition.

<b>Year-end Carrier Connections by Type</b>	2011	2012	2013	2014
<b>AT&amp;T</b>				
<b>Postpaid</b>	69,309,000	70,497,000	72,638,000	75,931,000
Prepaid	7,225,000	7,328,000	7,384,000	10,986,000
Wholesale	13,644,000	14,875,000	14,028,000	13,855,000
Connected Devices	13,069,000	14,257,000	16,326,000	19,782,000
Total	103,247,000	106,957,000	110,376,000	120,554,000
<b>Sprint</b>				
<b>Postpaid</b>	32,231,000	31,064,000	29,915,000	28,724,00
Prepaid	14,789,000	15,587,000	16,222,000	15,539,000
Wholesale	5,141,000	5,492,000	4,717,000	10,486,000
Connected Devices	2,860,000	3,483,000	4,500,000	6,355,000
Total	55,021,000	55,626,000	55,354,000	55,929,000
<b>T-Mobile</b>				
<b>Postpaid</b>	22,367,000	20,293,000	22,299,000	27,185,000
Prepaid	4,819,000	5,826,000	15,072,000	16,316,000
Wholesale	3,569,000	4,180,000	5,711,000	7,096,000
Connected Devices	2,429,000	3,090,000	3,602,000	4,421,000
Total	33,185,000	33,389,000	46,684,000	55,018,000
<b>Verizon</b>				
<b>Postpaid</b>	87,382,000	92,530,000	96,752,000	102,079,000
Prepaid	4,785,000	5,700,000	6,047,000	6,132,000
Wholesale	8,139,182	9,050,385	9,675,025	10,500,000
Connected Devices	9,932,941	11,405,588	13,095,882	15,000,000
Total	110,239,123	118,685,973	125,569,907	133,711,000

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What is clear about the current wireless market:

- It is hypercompetitive.
- It is still dominated by two leading carriers.
- It has a third carrier gaining market share rapidly.
- Its regulators favor redistributing spectrum to enhance competition.
- There will be very attractive low-band spectrum coming up for bid in 2016.

What we know about the future is that fixed and wireless data traffic continues to grow, but mobile far faster than fixed. Very soon, most data use will be mobile-first, if not mobile-only. Because of the siren song of mobility, we can expect a flood of new competitors from outside the traditional wireless industry; Google is just the first of the next wave.

Cisco's annual VNI Mobile Forecast for the U.S. underscores the continuing breadth and depth of the mobile data revolution:

- In the United States, mobile data traffic will grow sevenfold between 2014 and 2019, at a compound annual rate (CAGR) of 47%.
- U.S. mobile data traffic will grow 3x faster than U.S. fixed IP traffic from 2014 to 2019.
- Mobile data traffic will account for 8% of U.S. fixed and mobile data traffic by 2019, up from 3% in 2014.
- U.S. mobile video traffic will grow 8.6x between 2014 and 2019, at a CAGR of 54%. Video will account for 75% of all data traffic.
- In the United States, 89% of mobile connections (excluding LPWA) will be "smart" connections by 2019, up from 72% in 2014.
- 100% of U.S. mobile data traffic will be "smart" traffic by 2019, up from 99% in 2014.

- Monthly traffic per mobile-connected end-user device in the U.S. will reach 7.815 gigabytes by 2019, up from 1.5 GB in 2014, a CAGR of 39%.

## **Strategies & Considerations for Major Auction Bidders**

The dominant carriers might welcome a delay in the Incentive Auction to the degree that it would perpetuate a longer dry spell without low-band spectrum for the third- and fourth-ranked carriers and allow the leaders to further exploit their overweighting in low-band spectrum. But given the current competitive conditions, the inevitable surge in mobile broadband usage and network load, plus the likelihood of new over-the-top and network-based competition, Verizon and AT&T will most assuredly defend their market lead and try to ensure its future by actively competing for whatever spectrum comes to auction in 2016. For them the spectrum has value on multiple levels. Not only do they need more spectrum, but whatever they win leaves that much less for T-Mobile, Sprint and any other new entrants or existing players.

## Verizon Profile

Among the traditional wireless players, Verizon is best positioned and perhaps the most likely carrier to lead a strong showing in the 600 MHz Incentive Auction. Why?

- The 600 MHz spectrum auction will be the last unfettered opportunity Verizon and AT&T have to acquire low-band spectrum. The Incentive Auction is excluded from the new spectrum holding screen adopted by the FCC in May 2014. In the new screen, transactions involving low-band (below 1 GHz) spectrum will be called out for added scrutiny if the buyer owns approximately one-third or more of available low-band spectrum in a market. Except in a limited number of markets, Verizon and AT&T will always exceed that limit.
- Verizon has the biggest U.S. customer base and needs more spectrum to serve it. It has on average about 47 MHz of low-band spectrum across the vast majority of the markets in the country, out of a total bandwidth of 128 MHz of low-band spectrum available. That's 36.7%, so it is already over the one-third limit for sub-1 GHz spectrum ownership in most markets. That compares to AT&T, which has 49 MHz of paired low-band spectrum across most of the country, as well as another 12 MHz of unpaired 700 MHz spectrum in most of the largest markets, giving it 39% to 48% of available sub-1 GHz spectrum. Via the AWS-3 auction, Verizon increased its AWS spectrum depth by about one-third in markets across about 60% of the population. This will support Verizon's expanding densification program via a small cell network. The 600 MHz auction will give it the opportunity to rebalance its low- and mid-band holdings. And across all bands aggregated nationwide (pre-AWS-3 auction), Verizon trails the national spectrum position of AT&T, which led Verizon with 132 MHz of average spectrum depth vs Verizon's 103 MHz at the end of 2014. That ratio changed pro forma the AWS-3 auction to 115 MHz for Verizon versus 151 MHz for AT&T.
- Verizon has the most successful operating record and P&L in the industry. To date, Verizon has suffered the least dislocation in a pervasive price-and-promotion competition that has been raging in the mobile space since T-Mobile US began its initial "Uncarrier" campaign in early 2013. While it is selectively responding to competitive attacks with its own price adjustments, it continues to have the highest wireless EBITDA

margin in the industry at 42% in the fourth quarter of 2014, and has seen its subscription growth continue to outpace the field in spite of having shown more restraint in countering "Uncarrier" offensives than its peers. Its network superiority and brand power have served it well — and its success in the marketplace will expand its need for spectrum while also supporting its investments to acquire more.

- Verizon successfully funded the third-largest acquisition in history. Verizon's \$130 billion acquisition of Vodafone's 45% equity interest in Verizon Wireless was strategically important enough to the company for it to sacrifice its investment grade A rating in the credit market as a byproduct of consummating that deal in February 2014. It has shown itself willing and flexible enough to sacrifice the important A rating temporarily for assets valuable to its business goals. 600 MHz spectrum classifies as an equally valuable asset to Verizon, enough so for it to delay its return to an A credit rating status.
- Verizon is already managing its way back towards investment grade in 2015. Verizon's credit rating was reduced to Baa-1 from A-3 by Moody's, and BBB+ at S&P at the end of 2013 in response to Verizon doubling its debt from under \$50 billion to over \$100 billion in conjunction with buying Vodafone shares. Its net-debt-to-EBITDA ratio vaulted from 1.2x at mid-year 2013 to 2.4x when the Vodafone deal closed. As of fourth quarter 2014, it remained at 2.4x.

Yet Verizon promised creditors it would get its investment-grade ratings back inside of five years. In August 2014, Standard & Poor's upgraded Verizon's credit outlook to positive from stable, commenting that "the rating outlook revision reflects our expectation that leverage should continue to gradually decline, potentially reaching our 2.75x upgrade threshold by 2015." At year-end 2014, Verizon's debt-to-EBITDA ratio was 2.94x. S&P acknowledged that M&A and auction outlays beyond the \$17 billion threshold it was estimating for Verizon would push its forecasted ratio into 2016. That still implies Verizon could meet Moody's expectations inside of two years before addressing the 600 MHz auction.

With its triple play of M&A announcements on Feb. 5, Verizon showed how it will use monetization to de-lever and reward shareholders. Verizon has cut a deal with Frontier to sell \$10.5 billion of its wireline holdings in California, Florida and Texas. It also struck a sale and lease-back agreement for its tower portfolio with American Tower for

\$5.1 billion. The two deals will generate new cash of \$11.8 billion. Verizon will use year-end 2014 cash on hand (\$10.6 billion) to complete the share repurchase (\$5 billion) and pay for its AWS-3 winnings with a combination of cash and a term loan. It will then use its tower-deal proceeds to pay off the term debt and apply the profits from the Frontier sale to pay down debt in 2016. That keeps it comfortably inside its credit commitments, bolstering operating earnings and making room for new investments.

- Verizon wants to defend its lead position in wireless and guard against increasing encroachments by pay TV operators and Internet companies in the mobile space.<sup>4</sup> Ample spectrum assets, well distributed, are a primary underpinning for executing effectively on these goals. Over the past 18 months, under regulatory pressure, Verizon sold off substantial 700 MHz spectrum assets to T-Mobile and AT&T. The Incentive Auction is an opportunity to replace the sold spectrum with even better-situated bandwidth.
- Among the four national carriers, Verizon has the most constrained spectrum position as measured by its average spectrum depth as a multiple of its total retail customers nationwide. That ratio stands at 1.1x incorporating licenses won in the AWS-3 auction, still dramatically lower than for the other three carriers, as shown in the table below. T-Mobile has a ratio of 1.8x, AT&T 1.9x and Sprint a hefty 2.8x. If one measures its total subscription base against its spectrum holdings, the ratio is an even tighter 0.9x at Verizon compared to 1.3x for AT&T, 1.4x for T-Mobile and a hefty 2.3x for Sprint.

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<sup>4</sup> <https://gigaom.com/2015/01/28/cables-next-step-offer-virtual-cellular-service/>

### Carrier Broadband Spectrum to Retail Customer Base Ratio

	<b>Avg. Spectrum Depth*</b> <b>(MHz)</b>	<b>Retail Subs at YE 2014</b> <b>(mil.)</b>	<b>Spectrum to Sub Ratio</b> <b>(x)</b>	<b>Total Subs at YE 2014</b> <b>(mil.)</b>	<b>Spectrum to Sub Ratio</b> <b>(x)</b>
Verizon	115	108	1.1	133	0.9
AT&T	151	79	1.9	120	1.3
T-Mobile*	76	42	1.8	55	1.4
Sprint*	125	45	2.8	55	2.3

*\*Notes: estimated AWS-3 spectrum included in estimated spectrum depth statistics; T-Mobile data excludes LMDS licenses; Sprint spectrum data estimates its 800 MHz and EBS spectrum depth. © 2015 Kagan Media Appraisals, a service of SNL Financial LC, estimates. All rights reserved.*

The ratios give a broad-brush overview of relative capacities to serve the carriers on a national basis. But in truth, the wireless battles for customers are fought market-by-market, and the most capacity stress is in the large, dense metros. That's why having the combination of the AWS-3 auction and the 600 MHz auction spectrum held within the same visibility timeframe is so compelling for carriers' network planning. They can differentiate their needs on a market-by-market basis and bid accordingly to achieve a sufficient underlay network of low-band spectrum for a consistent layer of indoor and outdoor reach, combined with a mid- and upper-band small-cell overlay for added capacity and customizable coverage.

Below are highlights of Verizon's financial performance over the past three years.

### Verizon Consolidated Financial Highlights 2012-2014

<b>Period Ended</b>	<b>12/31/2012</b>	<b>12/31/2013</b>	<b>12/31/2014</b>
<b>Balance Sheet (\$ 000)</b>			
Cash and Cash Equivalents	3,093,000	53,528,000	10,598,000
Current Assets	21,235,000	70,994,000	29,623,000
Current Liabilities	26,956,000	27,050,000	28,064,000
Non-current Long-term Debt	47,618,000	89,658,000	110,536,000
Total Equity	85,533,000	95,416,000	13,676,000

**Income Statement (\$ 000)**

Communications Service Revenue	103,513,000	107,657,000	111,059,000
Operating Revenue, Net	115,846,000	120,550,000	127,079,000
Recurring EBITDA	29,944,000	48,438,000	35,281,000
Adjusted EBITDA	37,466,000	42,021,000	43,254,000
Net Income before Taxes	9,897,000	29,277,000	15,270,000
Net Income	10,557,000	23,547,000	11,956,000

**Cash Flow Statement Highlights (\$ 000)**

Cash Flow from Operating Activities	31,486,000	38,818,000	30,631,000
Capital Expenditures	(16,175,000)	(16,604,000)	(17,191,000)
Recurring Levered Free Cash Flow	11,447,000	29,290,000	9,861,000
Interest Paid	1,971,000	2,122,000	4,843,000
Income Taxes Paid	351,000	422,000	NA
Dividends Paid	(5,230,000)	(5,936,000)	(7,803,000)

**Balance Sheet Ratios (x)**

Total Debt/Total Equity	0.61	0.98	8.28
Net Debt and Preferred/Recurring EBITDA	1.47	0.94	2.72
Net Debt and Preferred/Adjusted EBITDA	1.18	1.08	2.22
<b>Adjusted EBITDA Margin (%)</b>	<b>29.40</b>	<b>32.64</b>	<b>32.66</b>

**Liquidity Ratios (x)**

Recurring EBITDA/Interest Expense plus Pfd.	11.65	18.16	7.18
Adjusted EBITDA/Interest Expense plus Pfd.	14.57	15.76	8.80
Recurring Unlevered FCF/Interest Expense	5.22	11.78	3.01

**Share Information**

Common Shares Outstanding (actual)	2,858,569,119	2,862,000,119	4,155,000,000
Avg. Diluted Shares (actual)	2,862,000,000	2,874,000,000	3,981,000,000

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## **AT&T Profile**

AT&T could well be the most conflicted of the national carriers with respect to the Incentive Auction, not because it isn't as hungry for this superior spectrum as the others, but because it has many issues competing for its attention and capital these days, as described below. Yet the company has underscored its intention and ability to stretch resources temporarily to take advantage of strategically important assets that become available.

AT&T is in the middle of a makeover. It is waiting for its DIRECTV acquisition to get regulatory approval and envisions new opportunities to offer customers innovative and competitive choices across voice, video and broadband services — for the first time integrating its wireline and wireless assets. And its follow-on acquisitions of lusacell and NII Mexico allow it to extend these bundled services and expand offerings across a North American network. There is also speculation that AT&T will bid on more assets in Latin America, among them America Movil assets owned by Carlos Slim.

In spite of the pressure these plans are putting on its balance sheet and leverage ratios, AT&T has made clear that it can handle the increased leverage without jeopardizing its gold-standard dividend (\$1.88/share, 5.6%), which it just increased minimally — but for the thirty-first year in a row. It currently has the highest credit rating among its peers as a starting point.

AT&T's acquisition drive to date has rung up an estimated tab of an additional \$57-plus billion in new spending since the end of third quarter 2014 (pro forma its acquisition of DIRECTV, lusacell [closed], Nextel Mexico and the AWS-3 auction, and excluding certain acquisition-related adjustments). Its long-term debt as of Sept. 30, 2014, was \$75 billion. It ended 2014 with \$76 billion of long-term debt, which could climb to \$132 billion in 2015, assuming the use of all debt for purchases. From a net-debt-to-EBITDA coverage ratio of 1.8x at year-end 2014, AT&T



could approach a 2.6x long term debt-to-EBITDA ratio in 2015, before adjusting for any asset sales that may be on the drawing board.

The company has acknowledged it will see an increase in its net-debt-to-EBITDA ratio to between 2.0x and 2.5x. The first downgrade already occurred Feb. 2, 2015, when Moody's [downgraded](#) AT&T's senior unsecured rating due to its spectrum purchases but kept it within investment grade, to Baa1 from A3. The ratings agency also has a negative outlook on the carrier. S&P cut its rating as well, but kept it in investment grade with the outlook stable. Thus AT&T has started down a path similar to what Verizon experienced in the process of buying out Vodafone. Nonetheless, AT&T has also alluded to multiple options for operational and financial cost savings as well as very monetizable real-estate assets to allow it to protect its dividend going forward and offset the cost of strategically valuable acquisition opportunities. For example, for the past three years running, AT&T has approached \$20 billion of total cash generation from free cash flow plus cash from asset sales.

#### **AT&T Forward Debt: EBITDA Ratio**

	(\$ mil.)
Long term debt at YE 2014	76,000
New cash out/debt. assumption	57,239
cash accumulation 2014-'15	<u>-18,000</u>
Net debt pro forma	115,239
Adjusted EBITDA pf DIRECTV	50,500
Net debt.:adj. EBITDA ratio	<b>2.28x</b>

#### **Components of New Debt**

	\$(mil.)
DIRECTV cash portion	15,000
DIRECTV debt assumption	19,750
NII Mexico assets	1,800
Iusacell	2,500
AWS-3 Auction	<u>18,189</u>
New debt total	<b>57,239</b>

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Despite its known financial commitments and its focus on launching a new business model in 2015, we believe AT&T will be both interested and financially prepared to participate in the 2016 Incentive Auction. Some of the most obvious drivers and supports for this expectation are shown below.

- As noted, the 600 MHz spectrum auction will be the last unfettered opportunity AT&T and Verizon have to acquire low-band spectrum. The Incentive Auction is excluded from the new spectrum holding screen adopted by the FCC in May 2014, by which transactions involving low-band (sub-1 GHz) spectrum will be called out for added scrutiny if the buyer owns approximately one-third or more of available low-band spectrum in a market. AT&T has already had at least three proposed acquisitions flagged for review. We don't expect it to have any meaningful loss of low-band spectrum, but this auction is the only option to acquire more.
- The rate of mobile data growth — mostly video — will drive all carriers to show up for the Incentive Auction. YouTube's mobile revenue doubled in fourth quarter 2014. 86% of Facebook's 1.39 billion users access the social media site on a mobile device. Mobile ads now represent 69% of the company's ad revenue and 68% of Facebook video is accessed from mobile. On top of that trend, the fierce competition in wireless is driving a carrier strategy of offering additional data capacity in both post- and prepaid plans to lure new customers. The extensive use of additional monthly Gigabyte volumes as a tool to attract customers puts continued pressure on network capacities and keeps the appetite for more spectrum alive. (*See also forecasts for U.S. data consumption through 2019 in the "State of the Wireless Union" section of this report.*)
- AT&T's repositioned focus is on wired/wireless enterprise business, where there are far higher capacity needs than in the wireless consumer market. AT&T's largest revenue segment is the integrated wired/wireless business, a broadband and video combination that produces about 45% of total revenues. There is significant and growing opportunity to incorporate mobile infrastructure into the high-bandwidth and high-volume uses of the enterprise including security, video and various vertical applications. AT&T's renewed concentration on the business segment generates higher network demand related to

wireless products bundled with VPN and business-solution products, and higher reward as a higher profit segment than the consumer side.

- Interest rates will rise. Although the incline may not be steep, the Federal Reserve will increase rates, so the best time to borrow is yesterday. Currently the Federal Reserve has targeted June or September to begin base-rate hikes.
- AT&T has robust access to capital at very attractive rates. Moody's Investors Service ranks AT&T A2, while [Standard & Poor's](#) grades it A-, one step lower. Fitch Ratings grades the company A.

On Jan. 21, 2015, AT&T entered an \$11-plus billion credit facility for 18-month, three-year and five-year borrowings syndicated by Mizuho Bank. The debt includes a covenant that AT&T will maintain a liberal debt-to-EBITDA financial ratio of not more than 3.0x. The net after-tax interest rate on that debt is below 1%.

Average yields on investment-grade corporate bonds have declined to 3.91%, according to Bank of America Merrill Lynch index data, as the [Federal Reserve](#) maintains its target rate for overnight lending between banks at zero to 0.25%. AT&T's position is far superior to even that level: currently, AT&T's after-tax cost of debt across its entire portfolio is "well below 3%," according to CFO John Stephenson.

- AT&T has operational savings on the horizon that can further cushion its acquisition forays. AT&T forecasts \$18 billion in capital expense for 2015, down \$3 billion from \$21.4 billion in 2014. That decline was precipitated in part by AT&T's accelerated execution of its three-year VIP wireless network upgrade campaign, which has achieved LTE coverage of over 300 million people. AT&T has indicated there will also be follow-on operating-expense reductions related to the conclusion of its big upgrade program, which will in turn increase cash-flow margins. Additionally, the DIRECTV acquisition will not be dilutive, and AT&T anticipates synergy savings of approximately \$1.6 billion based on the new scale the combined entity can exploit.

Below are financial highlights from AT&T's consolidated results for 2012-'14 plus several pro forma estimates for 2015.

**AT&T Financial Highlights 2012-2014**

Period Ended	12/31/2012	12/31/2013	12/31/2014	2015 (PF DIRECTV et al)
<b>Balance Sheet (\$ 000)</b>				
Cash and Cash Equivalents	4,868,000	3,339,000	8,603,000	12,000,000
Current Assets	22,706,000	23,196,000	32,028,000	
Current Liabilities	31,787,000	34,995,000	37,282,000	
Non-current Long-term Debt	66,358,483	69,290,294	76,011,000	132,000,000
Total Equity	92,695,000	91,482,000	86,924,000	
<b>Income Statement (\$ 000)</b>				
Communications Service Revenue	113,641,000	115,478,000	114,452,000	
Operating Revenue, Net	127,434,000	128,752,000	132,447,000	
Recurring EBITDA	31,892,000	49,516,000	33,101,000	
Adjusted EBITDA	41,134,000	41,290,000	40,795,000	50,000,000
Net Income before Taxes	10,439,000	27,777,000	9,960,000	
Net Income	7,539,000	18,553,000	6,518,000	
<b>Cash Flow Statement Highlights (\$ 000)</b>				
Cash Flow from Operating Activities	39,176,000	34,796,000	31,338,000	
Capital Expenditures	(19,728,000)	(21,228,000)	(21,433,000)	
Recurring Levered Free Cash Flow	7,992,000	22,001,000	4,613,000	
Interest Paid	3,714,000	4,302,000	NA	
Income Taxes Paid	458,000	1,985,000	NA	
Dividends Paid	(10,241,000)	(9,696,000)	(9,552,000)	
<b>Balance Sheet Ratios (x)</b>				
Total Debt/Total Equity	0.75	0.82	0.94	
Long term Debt/EBITDA	1.61	1.68	1.86	2.64
Net Debt and Preferred/Recurring EBITDA	1.95	1.43	2.22	
Net Debt and Preferred/Adjusted EBITDA	1.51	1.71	1.80	2.28
<b>Adjusted EBITDA Margin (%)</b>	32.28	32.07	30.80	
<b>Liquidity Ratios (x)</b>				
Recurring EBITDA/Interest Expense plus Pfd.	9.26	12.57	9.16	
Adjusted EBITDA/Interest Expense plus Pfd.	11.94	10.48	11.29	
Recurring Unlevered FCF/ Interest Expense	3.40	6.68	2.28	
<b>Share Information</b>				
Common Shares Outstanding (actual)	5,581,394,763	5,226,316,175	5,187,000,000	
Avg. Diluted Shares (actual)	5,821,000,000	5,385,000,000	5,221,000,000	

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## T-Mobile US Profile

T-Mobile should be the most highly motivated bidder in the Incentive Auction because it is the fastest-growing wireless carrier with the fewest network assets to support its drive. (*See spectrum holding summaries for four carriers in Exhibit A.*) That said, it has proved itself a superior competitor in its urban markets. To expand effectively in the core as it adds customers and to extend its reach beyond that core, it will have to have more low-band spectrum. To that end, T-Mobile bought out Verizon's 700 MHz A Block portfolio in 2014 and has continued consolidating the rest of the A Block with many smaller-market deals.

In spite of having on average no more than 80 MHz of total spectrum in most large markets and less in many others; it has built out a much denser network than most of its competitors in many larger markets. And it quickly migrated its spectrum to LTE and wide-band channels, so that it is already operating with 30 MHz (15x15) or 40 MHz (20x20) in 23 major markets. It also has high-performance HSPA+ to fall back on where its LTE presence is limited by spectrum limitations. Its high capacity has enabled it to use its unlimited data offering as an extremely attractive differentiator, and the wider channels have enabled it to offer higher data speeds in a number of pivotal markets, as documented by RootMetrics.<sup>5</sup> For example, it was in a three-way tie with Verizon and AT&T for overall performance in San Francisco in the second half of 2014, and took first place for data speeds. It also came in first in New York, Boston and Philadelphia on RootMetric's speed index, which has a weighted measurement for voice/data/text speeds. T-Mobile is counting on these performance gains to continue attracting customers and the follow-revenue gains associated with them.

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<sup>5</sup> <http://www.rootmetrics.com/us/rsr/map/2014-2H?z=united-states>

T-Mobile is also not burdened with any oversized commitments from the AWS-3 auction, in which it focused on mostly second-tier markets and spent a relatively modest \$1.77 billion and \$1.60 per MHz pop on average, far less than AT&T, Verizon or DISH Network. The company has indicated repeatedly that it is saving its firepower for the Incentive Auction.

T-Mobile subscriber gains continued in 2014 to the tune of 8.3 million net additions and two new customers gained for every one lost on average to a competitor. Its promotional Early Termination rebates offered to customers switching from another carrier was instrumental in recruiting many of its new customers. This has kept its cash flow under heavy pressure. At year-end 2014, the company had an estimated \$5.7 billion in adjusted EBITDA and estimated net debt of \$23.9 billion, pro forma its AWS-3 winnings and other private spectrum acquisitions, implying a 4.2x net-debt-to-EBITDA ratio, up from 3.4x in third quarter 2014, pre AWS-3 and other M&A.

T-Mobile has already covered the funding it will need to back its AWS-3 auction bids, but it will still have to raise capital for a strong showing in the Incentive Auction.

In its short history as a public company, T-Mobile US first received financial backing from Deutsche Telekom in its Metro PCS acquisition (Deutsche Telekom gave its subsidiary \$11.2 billion in debt capital, later selling off \$3 billion of the bonds to improve its own capital position).

But it has looked to third-party investors for its next layers of financial support. In August 2013, T-Mobile US issued its first debt offering as a public company: \$500 million of 5.25% bonds at par due September 2018, rated Ba3.

Now that it has had a string of positive results in growing its top-line business (revenue up 7% year-to-date through September 2014) and is forecasting an upturn in cash flow growth for 2015 — after seeing its EBITDA decline 5% over that same period and its EBITDA margin drop to

24% from 27% year over year — it has been back to the public debt and convertible market twice.

In September 2014, after proving its business model, T-Mobile came back to the high-yield debt market with more confidence, completing the sale of \$2 billion of senior unsecured notes in two issues: \$1.7 billion of eight-year notes with a 6.0% coupon, and \$1.8 billion of nine-year notes with a 6.375% coupon, both rated Ba3/BBB.

The capital markets appear definitely to be open to T-Mobile. The company took advantage of that just before year-end, using its equity as a backstop to keep its balance sheet in check with the Dec. 9, 2014, issuance of \$1.0 billion of 5.5% Series A non-voting convertible preferred shares. The company sold 20 million shares at \$50 each, comprising 17.4 million original shares plus an underwriter overallotment of 2.6 million additional shares. Goldman Sachs, Morgan Stanley and Citigroup were lead managers. The stock is exchangeable into TMUS shares at a 1.61 ratio at a \$31/share strike price with a mandatory redemption clause. The preferred stock traded at \$57.90/share Feb. 4, 2015, and was in the money at the end of TMUS trading Feb. 5.

T-Mobile was the largest bidder in the 2005 AWS auction, in which it spent \$4.2 billion, and future partner Metro PCS spent another \$1.3 billion of the \$13.9 billion in total winnings. That is where it got its heavy concentration (30 MHz-40 MHz) of mid-band spectrum in the country's major markets, which it has turned to its advantage in the new era of high-volume data consumption.

And it could be the high bidder again in 2016. That would underpin its focus on being able to keep upping the ante on top of its early success in major markets as well as deploying its strategy more broadly up through the enterprise, into new partnerships (e.g., with DISH

Network) and into the suburbs. To execute those expansions will require more low-band spectrum as well as taking good advantage of technological tricks.



## **Sprint Profile**

Sprint is a company in transition and thinks it sees some light in its long haul to growth and eventual profitability, although the end of the tunnel may still be a way off. Since its new CEO arrived in six months ago, the company has completely overhauled its marketing strategy. It has reduced all its plan prices and has pushed half-price deals in a promotion aimed specifically at AT&T and Verizon customers — all in an effort to win back subscribers.

At the same time it, needs to keep upgrading of its network ahead of its marketing push for new customers; otherwise, it will surely lose them. To date, Sprint has 270 million pops covered with LTE, including 125 million with LTE on 2.5 GHz. Getting the 2.5 GHz spectrum overlaid with LTE is pivotal to Sprint's Spark program, which will not only enable enhanced performance but will also allow Sprint to offer plans and services incorporating ultra-wide-band channels that can be a dramatic differentiator versus the competition. The company has on average over 120 MHz of 2.5 GHz spectrum almost nationwide.

Sprint's year-end operating results were mixed. It continued its uphill struggle to stay relevant in the wireless game all year, but with inconsistent success. In spite of reaching slightly positive postpaid net adds on its Sprint platform in the fourth quarter of 2014, it suffered a loss of 654,000 postpaid subscribers for the year. It had excellent, industry-leading gains in prepaid in the fourth quarter, but lost 461,000 customers in that division for the year because of poor performance in earlier quarters.

It was able to report nearly one million total units gained for 2014, but only thanks to the 2.1 million net adds in its wholesale group. All in, Sprint's postpaid base declined 3% in 2014, its prepaid base shrank 4% and its wholesale base grew 26%, for a 1% decline in total connections.

It reported an impressive 20% gain in prepaid gross adds, which implies its messaging is gaining traction. Based on its improved results in the fourth quarter and what it saw in January 2015, the company is forecasting a 5% to 7% improvement in EBITDA, driven by increasing subs and revenues and taking costs out of its business. Sprint is citing in particular a reduction in churn and its move to lease billing. It reported \$6.1 billion in calendar-year adjusted EBITDA, above its guidance. But cash EBITDA adjusted for its leasing and equipment installment plan (EIP) programs would have been below guidance.

With no visible end in sight to the promotion-heavy competitive hands being played by all carriers, it is too soon to say whether Sprint's new initiatives will work. It has seen a sizable increase in in-store traffic responding to its marketing, and a good sign is that its network performance has been registering steady improvements as measured by independent ratings firms like RootMetrics. Now its challenge is to get that word of its network quality out to consumers. A Feb. 5, 2015, deal with bankrupt Radio Shack, which plans to continue operating under bankruptcy protection, will give Sprint distribution in 1,750 new prime locations. Radio Shack, however, is continuing to solicit other bids, so the deal is not yet final.

That leaves Sprint as a company focused first on how to fund its present before funding its future. Its primary goal now is to stop losing customers by offering quality service on a fully upgraded network. How it will pay for the continuation of the upgrade at a competitive pace has been a question mark for investors.

Sprint recently made moves to answer that question in part by putting in place \$2.1 billion of new financing. On Jan. 7, 2015, it revealed three new vendor financing facilities (Nokia, Samsung, and ALU) totaling \$1.8 billion to purchase 2.5 GHz network equipment and related services from key suppliers. It also amended and expanded by \$300 million its credit

relationship with Export Development Canada (EDC), as well as amending terms on its existing secured equipment credit facility.

It is also moving closer to the end of its drawn-out involvement with the 800 MHz rebanding process initiated with the FCC in 2005. Its commitment to finance incumbent reconfigurations in this band has been a costly and arduous task. But in 2014, the FCC allowed it to reduce its Letter of Credit related to these costs from \$850 million to \$434 million, further increasing Sprint's financial flexibility.

Sprint's year-end debt was \$32.5 billion; net debt was \$28.8 billion. At year-end it had \$3.7 billion of cash plus a revolving credit line and a receivables facility, giving it \$7.5 billion of liquidity with which to work until its next significant debt maturity date at the end of 2016. But unless Sprint can stanch the free cash flow losses, which amounted to negative \$1.8 billion in calendar fourth quarter 2014 and negative \$3.5 billion for the year, it will need more funding much sooner.

There is no doubt SoftBank can fund Sprint's participation in the Incentive Auction; the company has more than \$20 billion in cash on hand. SoftBank CEO Masa Son hand-picked new Sprint CEO Marcelo Claure and will want to see how the company is trending operationally before deciding what course to take.

For a near-term infusion of cash while Sprint works on its recovery, the company could monetize via sale or lease some of its abundant 2.5 GHz spectrum. Both Verizon and AT&T have expressed interest in buying it, with Verizon reported in 2013 to have had a deal on the table to buy up to \$1.5 billion worth of Clearwire's 2.5 GHz spectrum before its final Sprint roll-up. And the high prices bid in the AWS-3 auction increase the perceived value of currently available spectrum.

More likely SoftBank and Sprint will defer a decision on what options to pursue, giving Sprint a chance to prove a trendline and/or find a suitable partner. It historically has been the carrier most amenable to partnerships, and there is no shortage of candidates trawling the waters for the optimal ways to exploit mobile broadband. There is already a ready partner for Sprint in Deutsche Telekom's T-Mobile, and DT appears not to have given up on that transaction.

## Access to the Capital Markets

One of the least-appreciated elements in support of there being sufficient funding for the 2016 Broadcast Incentive Auction is just how much liquidity there is in the credit markets available to media and communications companies, particularly in the telecom sector.

In 2014, the bucket group of communications companies (wireline and wireless telcos, cable, satellite, wholesale broadband, and towers) issued \$110.4 billion of public debt in the U.S. market. Four telcos accounted for more than 52% of that total, or \$57.8 billion. In that subgroup, Verizon issued \$30.8 billion or 53% of the pie, AT&T \$15 billion or 26%, Sprint \$9 billion and 16% and T-Mobile USA \$3 billion for 5%.

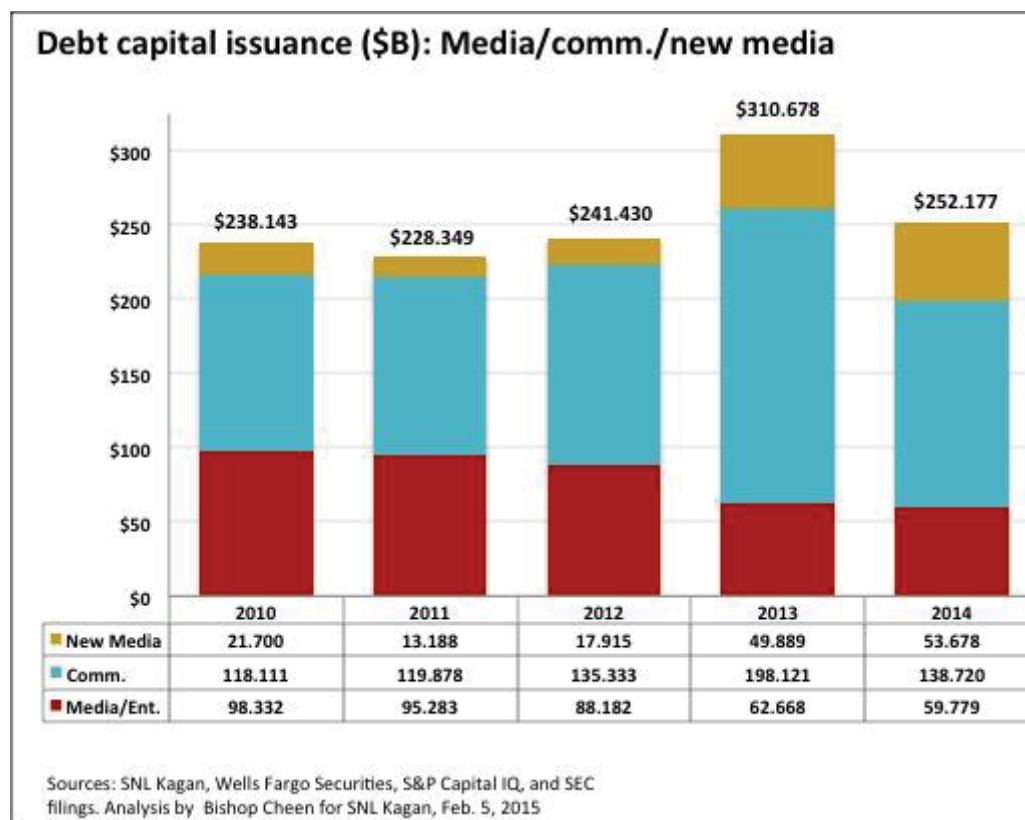
As the record of debt financings in two different views below shows, this is a long-term trend, and in the broader media-and-communications space, the communications companies are the most active borrowers of all. *(For a detailed list of all the 2014 public debt issued by Verizon, AT&T, T-Mobile and Sprint as well as a record of the 2014 High Yield debt from all U.S. telecom companies, see Exhibit B)*

Telecom Public Debt Raised in 2014		
	2014 Public Debt Issues	% of Communication Group Loans
AT&T	\$15,010,295	26%
Verizon	\$30,780,595	53%
Sprint	\$9,000,000	16%
T-Mobile	\$3,000,000	5%
Total	\$57,790,890	100%
Communications Group Total*	\$110,287,950	Telecom % Total Comm. Group
Communications Group Total-all sources:	\$138,720,000	52.4%
		41.7%

\*Group consists of wired/wireless telecom, cable, satellite, tower, fixed broadband companies.

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The communications companies sold \$138.7 billion in public and bank debt in 2014, and that was just par for the course. Over the past five years, this group has averaged \$142 billion in new debt issues per year. The peak came in 2014 at \$198 billion, boosted by Verizon's capital raise for Vodafone. With the Incentive Auction coming up, 2016 could produce another peak.



Not only have the traditional wireless players proven to be favored guests in the credit markets year after year, there could also be outside aspirants interested in the Incentive Auction. Potential bidders like cable companies are also already active and successful participants in the capital markets. And the Internet technology contingent, such as Google and Apple, are already cash-heavy companies that would be quickly wooed by the capital markets were they interested.

## Summary Conclusions

Spectrum has always been a cornerstone of success in the wireless industry. At the very beginning of U.S. commercial cellular's history in the late 1980s — even before anyone had an inkling how powerful the concept of pure mobility would become, nor how many industries it would not only touch, but revolutionize — radio spectrum was a coveted commodity.

It still is. But now it is an equally valuable component of dealmaking in the cross-collateralized worlds of mobile wireless, fixed fiber broadband, pay TV, Over-the-Top distribution and media content.

The operative question may not be whether or not wireless companies will be financially equipped and ready to be in the 2016 Incentive Auction. As we have discussed in this report, financial resources and motivation will not likely be the deciding factor for these companies. Rather, what our current roster of traditional players will look like when it comes time for this auction is more critical. With whom they partner and what businesses they want to expand into will drive Incentive Auction strategies. That they will be working in the future with new partnerships toward new markets and new businesses is a foregone conclusion.

- Verizon is readying an OTT content play and aiming to be a platform for multiple forms of distribution, both commercial and consumer, horizontal and vertical.
- AT&T has made its move into Latin America and is pushing aggressively into home automation and connected-device verticals. It is also developing OTT video services with DIRECTV and The Chernin Group, among other broadband initiatives.
- SoftBank's vision for Sprint after a turnaround is for truly seamless global broadband networks, using 2.5 GHz as the international linchpin and low-band spectrum as the base layer of a very high-capacity HetNet.

- DISH envisions combining customer bases and services across fixed and mobile broadband using terrestrial and satellite networks. Its partners could be one or more of multiple candidates.
- Google, Amazon, Apple, Facebook and Comcast, among others have yet to articulate the scope of their next forays involving wireless, but the plans are being laid.
- Integrations of wired and wireless broadband, Wi-Fi, satellite, cable and broadcast networks into new high-capacity, customizable delivery networks are coming soon.

Eventually building out small-cell networks could yield a better return on investment than spending money on new spectrum, but the industry is not at that point in its development yet, especially considering the size and scope of the new business models we have outlined in the bullets above and the exponential growth in mobile data consumption described earlier in this report. Spectrum costs are high, but the returns factored in to the vertically integrated fixed and mobile service platforms that are being built for business models that span multiple industries over the next decade warrant the outlay.

Might AT&T and Verizon like to postpone going to the credit-market well again so soon (post-Vodafone for Verizon and following AT&T's DIRECTV and Mexican deals)? Perhaps. Could Sprint and T-Mobile have more capital assets at their disposal at a later date? Maybe.

But realistically, whenever the Incentive Auction takes place, the combination of surging wireless usage and demand, the desire to protect their franchises, the added foreclosure value of getting control of limited spectrum resources, the lure of low-band spectrum and the plans for generating new and lucrative cross-platform revenue streams should be irresistible drivers for the carriers to be there and bid hard for the spectrum that suits their needs.



# EXHIBIT A

## Spectrum Holding Summaries for Four Carriers

### VERIZON LICENSE HOLDINGS at February 1 2015 (not proforma AWS-3 auction winnings in 1.7-2.1 GHZ band)

Unduplicated Population Served By							
	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Total Operated*
AWS	456	67	71	314,756,113	16,518,789	30,072,172	314,756,113
Cellular	759	21	17	276,925,066	4,246,521	3,076,602	276,925,066
PCS	708	84	74	307,961,865	75,314,673	76,395,206	307,985,349
700 MHz Upper	10	177	144	317,183,975	211,586,300	209,428,015	317,183,975
700 MHz Lower	3	0	1	5,745	0	9,949	15,695
Total	1,936	349	307	317,183,975	238,278,589	234,924,895	317,183,975

### SPRINT LICENSE HOLDINGS at February 1 2015 (excludes 14 MHz of 800 MHz nationally and some EBS leased spectrum)

Unduplicated Population Served By							
	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Total Operated*
BRS	571	6	20	307,703,712	869,887	27,124,735	308,077,270
PCS	499	24	0	317,183,975	2,631,616	0	317,183,975
EBS	38	0	1,262	6,306,761	0	278,715,974	280,021,676
LMDS	1	0	0	286,018	0	0	286,018
WCS	19	0	0	40,209,124	0	0	40,209,124
Total	1,128	30	1,282	317,199,397	3,491,484	283,368,166	317,199,397

### AT&T LICENSE HOLDINGS at February 1 2015 (not proforma AWS-3 auction winnings in 1.7-2.1 GHZ band)

Unduplicated Population Served By							
	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Total Operated*
AWS	451	12	7	226,879,285	4,707,561	4,030,922	226,879,285
Cellular	655	2	0	260,423,988	564,954	0	260,423,988
PCS	1,261	101	37	316,235,141	10,487,582	10,583,496	316,235,141
WCS	131	7	0	317,183,975	6,963,182	0	317,183,975
700 MHz Lower	1,030	9	11	317,183,975	988,404	4,550,088	317,183,975
Total	3,528	131	55	317,199,353	22,782,696	16,437,405	317,199,353

### T-MOBILE LICENSE HOLDINGS at February 1 2015 (not proforma AWS-3 auction winnings in 1.7-2.1 GHZ band)

Unduplicated Population Served By							
	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Licenses Owned	Leases to 3 <sup>rd</sup> Party	Leases from 3 <sup>rd</sup> Party	Total Operated*
AWS	237	11	8	316,849,433	4,377,432	6,851,043	316,462,980
Cellular	1	0	0	383,657	0	0	383,657
PCS	601	51	36	314,637,854	37,190,153	42,619,814	314,251,401
LMDS	20	0	0	97,277,570	0	0	97,277,570
700 MHz Lower	46	0	0	174,632,676	0	0	174,632,676
Total	905	62	44	316,849,433	40,222,319	48,745,618	316,462,980

\*includes leases to and from 3<sup>rd</sup> parties.

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## EXHIBIT B

### Completed Offerings in 2014 – Top 4 Wireless Carriers

Completion Date	Company Offering Description	Industry	Country	Cpn Rate (%)	Offer Price (%)	Maturity Date	Amount	Currency
11/12/2014	AT&T Inc. 0.500% Government bonds, due Dec 4, 2019	Communications	USA	0.5000	100.17	12/4/2019	466,950	(\$000)
11/12/2014	AT&T Inc. 1.375% Government bonds, due Dec 4, 2024	Communications	USA	1.3750	100.06	12/4/2024	466,950	(\$000)
11/20/2014	AT&T Inc. 1.450% Unsecured global notes, due June 1, 2022	Communications	USA	1.4500	99.71	6/1/2022	1,881,114	(\$000)
11/12/2014	AT&T Inc. 1.875% Government bonds, due Dec 4, 2030	Communications	USA	1.8750	101.02	12/4/2030	155,650	(\$000)
3/5/2014	AT&T Inc. 2.300% Global unsecured notes, due Mar 11, 2019	Communications	USA	2.3000	100.00	3/11/2019	1,100,000	(\$000)
6/4/2014	AT&T Inc. 2.400% Global unsecured notes, due Mar 15, 2024	Communications	USA	2.4000	99.93	3/15/2024	2,179,243	(\$000)
11/20/2014	AT&T Inc. 2.600% Unsecured global notes, due Dec 17, 2029	Communications	USA	2.6000	99.83	12/17/2029	1,003,261	(\$000)
6/4/2014	AT&T Inc. 3.375% Global unsecured notes, due Mar 15, 2034	Communications	USA	3.3750	99.88	3/15/2034	681,013	(\$000)
3/5/2014	AT&T Inc. 3.900% Global unsecured notes, due Mar 11, 2024	Communications	USA	3.9000	99.70	3/11/2024	1,000,000	(\$000)
10/27/2014	AT&T Inc. 4.700% Global unsecured notes, due Nov 10, 2044	Communications	USA	4.7000	100.00	11/10/2044	1,295,000	(\$000)
6/3/2014	AT&T Inc. 4.800% Global unsecured notes, due June 15, 2044	Communications	USA	4.8000	99.64	6/15/2044	2,000,000	(\$000)
11/20/2014	AT&T Inc. Floating rate unsecured global notes, due June 4, 2019	Communications	USA	Variable	100.00	6/4/2019	1,881,114	(\$000)
3/5/2014	AT&T Inc. Floating rate unsecured global notes, due Mar 11, 2019	Communications	USA	Variable	100.00	3/11/2019	400,000	(\$000)
3/26/2014	AT&T Inc. Floating rate unsecured global notes, due Mar 30, 2017	Communications	USA	Variable	100.00	3/30/2017	500,000	(\$000)
11/14/2014	Sprint Corporation 7.125% Senior unsecured notes, due June 15, 2024	Communications	USA	7.1250		6/15/2024	2,500,000	(\$000)

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11/14/2014	Sprint Corporation 7.250% Senior unsecured notes, due Sept 15, 2021	Communications	USA	7.2500	9/15/2021	2,250,000	(\$000)
11/14/2014	Sprint Corporation 7.875% Senior unsecured notes, due Sept 15, 2023	Communications	USA	7.8750	9/15/2023	4,250,000	(\$000)
9/3/2014	T-Mobile USA, Inc. senior notes due 2022	Communications	USA	6.0000	2023	1,300,000	
9/3/2014	T-Mobile USA, Inc. senior notes due 2022	Communications	USA	6.0000	2025	1,700,000	
6/4/2014	Verizon Communications Inc. 1.350% Senior unsecured notes, due June 9, 2017	Communications	USA	1.3500	99.95	2,000,000	(\$000)
11/24/2014	Verizon Communications Inc. 1.625% Senior unsecured notes, due Mar 1, 2024	Communications	USA	1.6250	99.87	1,741,294	(\$000)
2/5/2014	Verizon Communications Inc. 2.375% Senior unsecured notes, due Feb 17, 2022	Communications	USA	2.3750	99.50	2,368,065	(\$000)
3/10/2014	Verizon Communications Inc. 2.550% Senior unsecured note, due June 17, 2019	Communications	USA	2.5500	99.88	500,000	(\$000)
11/24/2014	Verizon Communications Inc. 2.625% Senior unsecured notes, due Dec 1, 2031	Communications	USA	2.6250	99.32	1,243,781	(\$000)
8/19/2014	Verizon Communications Inc. 2.625% Senior unsecured notes, due Feb 21, 2020	Communications	USA	2.6250	2/21/2020		(\$000)
8/19/2014	Verizon Communications Inc. 2.625% Senior unsecured notes, due Feb 21, 2020	Communications	USA	2.6250	2/21/2020		(\$000)
10/22/2014	Verizon Communications Inc. 3.000% Senior unsecured notes, due Nov 1, 2021	Communications	USA	3.0000	99.70	1,500,000	(\$000)
2/5/2014	Verizon Communications Inc. 3.250% Senior unsecured notes, due Feb 17, 2026	Communications	USA	3.2500	99.88	1,691,475	(\$000)
3/10/2014	Verizon Communications Inc. 3.450% Senior unsecured notes, due Mar 15, 2021	Communications	USA	3.4500	99.98	1,000,000	(\$000)
10/22/2014	Verizon Communications Inc. 3.500% Senior unsecured notes, due Nov 1, 2024	Communications	USA	3.5000	99.34	2,500,000	(\$000)
6/25/2014	Verizon Communications Inc. 4.073% Senior unsecured notes, due June 18, 2024	Communications	USA	4.0730	6/18/2024	1,180,034	(\$000)

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3/10/2014	Verizon Communications Inc. 4.150% Senior unsecured notes, due Mar 15, 2024	Communications	USA	4.1500	99.84	3/15/2024	1,250,000	(\$000)
10/22/2014	Verizon Communications Inc. 4.400% Senior unsecured notes, due Nov 1, 2034	Communications	USA	4.4000	99.28	11/1/2034	2,500,000	(\$000)
2/5/2014	Verizon Communications Inc. 4.750% Senior unsecured notes, due Feb 17, 2034	Communications	USA	4.7500	99.61	2/17/2034	1,385,945	(\$000)
9/9/2014	Verizon Communications Inc. 4.800% Senior unsecured notes, due Sept 23, 2044	Communications	USA	4.8000	100.00	9/23/2044	870,000	(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 4.862% Senior unsecured notes, due Aug 21, 2046	Communications	USA	4.8620		8/21/2046		(\$000)
8/19/2014	Verizon Communications Inc. 5.012% Senior unsecured notes, due Aug 21, 2054	Communications	USA	5.0120		8/21/2054	5,500,001	(\$000)
3/10/2014	Verizon Communications Inc. 5.050% Senior unsecured notes, due Mar 15, 2034	Communications	USA	5.0500	99.93	3/15/2034	1,250,000	(\$000)
1/30/2014	Verizon Communications Inc. 5.900% Senior unsecured notes, due Feb 15, 2054	Communications	USA	5.9000	100.00	2/15/2054	500,000	(\$000)
3/10/2014	Verizon Communications Inc. Floating rate senior unsecured notes, due June 17, 2019	Communications	USA	Variable	100.00	6/17/2019	500,000	(\$000)
6/4/2014	Verizon Communications Inc. Floating rate senior unsecured notes, due June 9, 2017	Communications	USA	Variable	100.00	6/9/2017	1,300,000	(\$000)

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## EXHIBIT B

HY Telecom Capital Markets Activity					
Date	Issuer	Ticker	Debt Ratings	Security	Amount (\$million)
<b>Calendar Year 2015</b>					
1/20/15	Zayo Group LLC	ZAYOGR	Caa1/CCC+	6.0% Sr. Notes due 2023	700
1/14/15	Level 3 Communications Inc.	LVLT	B3/B	5.625% Sr. Notes due 2023	500
<b>Total</b>					<b>1,200</b>
<b>Calendar Year 2014</b>					
11/17/14	Level 3 Communications Inc.	LVLT	Caa1/B-	5.75% Sr. Notes due 2022	600
11/17/14	Equinix Inc.	EQIX	B1/BB	5.375% Sr. Notes due 2022	750
11/17/14	Equinix Inc.	EQIX	B1/BB	5.75% Sr. Notes due 2025	500
9/4/14	Consolidated Communications	CNSL	B3/B-	6.5% Sr. Notes due 2022	200
9/3/14	T-Mobile USA, Inc.	TMUS	Ba3/BB	6.0% Sr. Notes due 2023	1,300
9/3/14	T-Mobile USA, Inc.	TMUS	Ba3/BB	6.375% Sr. Notes due 2025	1,700
9/3/14	Frontier Communications	FTR	Ba3/BB-	6.25% Sr. Notes due 2021	775
9/3/14	Frontier Communications	FTR	Ba3/BB-	6.875% Sr. Notes due 2024	775
7/29/14	Level 3 Communications Inc.	LVLT	B3/B	5.375% Sr. Notes due 2022	1,000
6/17/14	SBA Communications Corp	SBAC	B3/B	4.875% Sr. Notes due 2022 (Holdco)	750
4/1/14	Cogent Communications	CCOI	Caa1/B-	5.625% Sr. Notes due 2021	200
4/1/14	Crown Castle International	CCI	B1/BB-	4.875% Sr. Notes due 2022	850
3/19/14	Digicel Group Ltd.	DLLTD	Caa1/NR	7.125% Sr. Notes due 2022	1,000
2/10/14	B Communications Ltd.	BCOM	NR/BB-	7.375% Sr. Sec. Notes due 2021	800
<b>Total</b>					<b>11,200</b>

Source: Wells Fargo High Yield Research

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## EXHIBIT C

### Wireless Market Exposure - Average Spectrum Depth in Top 100 CMA Markets

*These data have not been adjusted to reflect AWS-3 auction results; T-Mobile data exclude estimated LMDS spectrum,*

*Sprint data includes an estimated 14 MHz of 800 MHz spectrum per market*

*PF AWS-3 winners AT&T would have 20 additional MHz in all CMAs listed; Verizon would have 10-20 MHz in some markets*

Market #	Market Name	AT&T	Verizon	T-Mobile	Sprint
CMA001	New York, NY-NJ/Nassau-Suffolk, NY/Newark, Jersey City et al	121.00	127.00	126.35	130.35
CMA002	Los Angeles-Long Beach/Anaheim-Santa Ana-Garden Grove/Riverside et al	141.00	105.05	113.14	117.14
CMA003	Chicago, IL	157.00	97.00	137.50	141.50
CMA004	Philadelphia, PA	145.21	97.00	127.92	131.92
CMA005	Detroit/Ann Arbor, MI	125.00	107.00	127.81	131.81
CMA006	Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH	131.03	117.00	141.65	145.65
CMA007	San Francisco-Oakland, CA	141.00	107.00	112.01	116.01
CMA008	Washington, DC-MD-VA	142.96	107.00	123.46	127.46
CMA009	Dallas-Fort Worth, TX	90.12	82.00	149.25	153.25
CMA010	Houston, TX	155.00	95.91	117.50	121.50
CMA011	St. Louis, MO-IL	140.76	77.00	137.50	141.50
CMA012	Miami-Fort Lauderdale-Hollywood, FL	134.11	92.00	117.50	121.50
CMA013	Pittsburgh, PA	145.00	106.10	131.67	135.67
CMA014	Baltimore, MD	145.00	117.00	117.61	121.61
CMA015	Minneapolis-St. Paul, MN-WI	124.73	126.02	117.33	121.33
CMA016	Cleveland, OH	120.00	102.00	134.31	138.31
CMA017	Atlanta, GA	111.34	107.00	105.72	109.72
CMA018	San Diego, CA	150.00	97.00	127.47	131.47
CMA019	Denver-Boulder, CO	164.07	86.90	113.46	117.46
CMA020	Seattle-Everett, WA	125.00	106.78	149.40	153.40
CMA021	Milwaukee, WI	134.33	82.00	117.50	121.50
CMA022	Tampa-St. Petersburg, FL	115.00	117.00	116.25	120.25
CMA023	Cincinnati, OH-KY-IN	145.00	87.00	169.57	173.57
CMA024	Kansas City, MO-KS	146.36	109.56	127.50	131.50
CMA025	Buffalo, NY	145.00	87.00	116.72	120.72
CMA026	Phoenix, AZ	130.01	112.00	127.50	131.50
CMA027	San Jose, CA	141.00	97.00	112.19	116.19
CMA028	Indianapolis, IN	155.00	105.73	158.80	162.80
CMA029	New Orleans, LA	130.00	126.72	128.25	132.25
CMA030	Portland, OR-WA	145.00	97.11	127.50	131.50
CMA031	Columbus, OH	125.00	107.00	150.36	154.36
CMA032	Hartford-New Britain-Bristol, CT	136.00	112.00	128.39	132.39
CMA033	San Antonio, TX	170.00	72.00	125.00	129.00
CMA034	Rochester, NY	155.00	87.00	127.50	131.50
CMA035	Sacramento, CA	140.00	97.00	118.40	122.40
CMA036	Memphis, TN-AR-MS	150.00	87.00	127.50	131.50

## EXHIBIT C

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CMA037	Louisville, KY-IN	164.29	97.00	127.50	131.50
CMA038	Providence-Warwick-Pawtucket, RI	120.90	107.00	131.61	135.61
CMA039	Salt Lake City-Ogden, UT	155.00	97.89	117.50	121.50
CMA040	Dayton, OH	125.00	107.00	161.77	165.77
CMA041	Birmingham, AL	110.00	102.00	137.50	141.50
CMA042	Bridgeport-Stamford-Norwalk-Danbury, CT	121.00	127.00	111.00	115.00
CMA043	Norfolk-Virginia Beach-Portsmouth, VA/NC	110.00	132.00	117.50	121.50
CMA044	Albany-Schenectady-Troy, NY	145.05	97.00	139.99	143.99
CMA045	Oklahoma City, OK	166.05	97.00	118.03	122.03
CMA046	Nashville-Davidson, TN	145.00	102.00	133.34	137.34
CMA047	Greensboro-Winston-Salem-High Point, NC	120.41	112.98	104.32	108.32
CMA048	Toledo, OH-MI	100.00	174.02	139.80	143.80
CMA049	New Haven-West Haven-Waterbury-Meriden, CT	121.00	107.00	127.50	131.50
CMA050	Honolulu, HI	110.00	87.00	98.25	102.25
CMA051	Jacksonville, FL	117.78	102.00	117.68	121.68
CMA052	Akron, OH	120.00	102.00	138.98	142.98
CMA053	Syracuse, NY	155.00	97.00	127.50	131.50
CMA054	Gary-Hammond-East Chicago, IN	147.00	97.00	137.50	141.50
CMA055	Worcester-Fitchburg-Leominster, MA	132.57	107.00	175.60	179.60
CMA056	Northeast Pennsylvania, PA	121.00	104.18	127.50	131.50
CMA057	Tulsa, OK	150.00	52.00	117.31	121.31
CMA058	Allentown-Bethlehem-Easton, PA-NJ	131.00	100.47	127.50	131.50
CMA059	Richmond, VA	120.00	132.00	117.50	121.50
CMA060	Orlando, FL	130.00	92.00	125.00	129.00
CMA061	Charlotte-Gastonia, NC	118.00	122.00	107.94	111.94
CMA062	New Brunswick-Perth Amboy-Sayreville, NJ	121.00	127.00	124.56	128.56
CMA063	Springfield-Chicopee-Holyoke, MA	141.00	97.00	158.09	162.09
CMA064	Grand Rapids, MI	101.23	127.00	127.50	131.50
CMA065	Omaha, NE-IA	110.00	100.32	117.50	121.50
CMA066	Youngstown-Warren, OH	155.00	87.00	115.65	119.65
CMA067	Greenville-Spartanburg, SC	131.55	112.00	135.69	139.69
CMA068	Flint, MI	125.00	97.00	152.89	156.89
CMA069	Wilmington, DE-NJ-MD	151.00	97.00	128.19	132.19
CMA070	Long Branch-Asbury Park, NJ	121.00	127.00	111.45	115.45
CMA071	Raleigh-Durham, NC	128.00	132.00	118.62	122.62
CMA072	West Palm Beach-Boca Raton, FL	140.00	92.00	112.24	116.24
CMA073	Oxnard-Simi Valley-Ventura, CA	131.00	105.16	111.00	115.00
CMA074	Fresno, CA	165.00	121.05	117.50	121.50
CMA075	Austin, TX	150.00	72.00	147.50	151.50
CMA076	New Bedford-Fall River, MA	121.00	107.00	128.48	132.48
CMA077	Tucson, AZ	130.00	147.00	127.50	131.50
CMA078	Lansing-East Lansing, MI	110.24	132.00	127.67	131.67
CMA079	Knoxville, TN	137.50	97.00	115.00	119.00
CMA080	Baton Rouge, LA	145.00	117.00	132.50	136.50
CMA081	El Paso, TX	140.00	102.00	185.00	189.00

## EXHIBIT C

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CMA082	Tacoma, WA	145.00	96.78	146.97	150.97
CMA083	Mobile, AL	95.00	117.00	142.50	146.50
CMA084	Harrisburg, PA	125.00	97.00	127.50	131.50
CMA085	Johnson City-Kingsport-Bristol, TN-VA	100.00	127.00	117.50	121.50
CMA086	Albuquerque, NM	140.00	137.00	66.52	70.52
CMA087	Canton, OH	130.00	102.00	131.10	135.10
CMA088	Chattanooga, TN-GA	134.41	107.00	124.40	128.40
CMA089	Wichita, KS	141.85	109.13	127.39	131.39
CMA090	Charleston-North Charleston, SC	153.68	126.00	77.30	81.30
CMA092	Little Rock-North Little Rock, AR	150.00	112.00	127.50	131.50
CMA093	Las Vegas, NV	145.00	87.00	127.50	131.50
CMA094	Saginaw-Bay City-Midland, MI	120.16	132.00	161.21	165.21
CMA095	Columbia, SC	110.19	132.00	116.11	120.11
CMA096	Fort Wayne, IN	145.00	93.67	127.50	131.50
CMA097	Bakersfield, CA	176.00	120.86	117.50	121.50
CMA098	Davenport-Rock Island-Moline, IA/IL	130.00	87.00	100.96	104.96
CMA099	York, PA	125.00	97.00	127.50	131.50
CMA100	Shreveport, Louisiana	105.00	117.00	147.50	151.50
<b>Simple Average</b>		<b>133.88</b>	<b>105.96</b>	<b>127.29</b>	<b>131.29</b>

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## QUALIFICATIONS OF THE ANALYST

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**Sharon B. Armbrust** is a senior consultant to Kagan Media Appraisals, Ms. Armbrust has participated in the valuation of over \$118 billion of media and communications properties during the past 30 years. She has prepared and/or presented testimony and acted as an expert witness in cable TV, broadcast and fixed and mobile wireless related litigations. Ms. Armbrust is also sr. analyst for Kagan Research's successor research product to its newsletter reports, SNL Kagan's WIRELESS INVESTOR Service, electronically delivered economic and financial research for the mobile wireless and tower industry sectors.

Ms. Armbrust was formerly the Chief Operating Officer for Kagan Research and Senior Financial Analyst for a half dozen of the Kagan group's investment newsletters--*CABLE TV INVESTOR: DEALS & FINANCE*, *WIRELESS TELECOM INVESTOR*, *WIRELESS MARKET STATS*, and *TOWER INVESTOR*. She was also executive editor of a number of the Kagan group's special reports, including *The Cable TV Financial Databook*, *The PCS Atlas & Databook*, *The Cellular Telephone Atlas* and *The Wireless Telecom Financial Databook*. Additionally, she organized and co-moderated wireless telecom and digital media investment conferences held periodically by Kagan Seminars Inc. She has been engaged in this business since April, 1979, when she joined Kagan, shortly after it moved to Carmel, CA.

Prior to joining Kagan, Ms. Armbrust held financial positions in the retail clothing and data processing industries. She holds a bachelor's degree (BA) in German and French literature from the University of Michigan and a Master of Arts (MA) in French & German literature and Master of Arts in Teaching (MATS) from The Johns Hopkins University.